

August 16, 2017

Mr. Scott T. Anderson, Director
Utah Department of Environmental Quality
Division of Waste Management and Radiation Control
P.O. Box 144880
Salt Lake City, UT 84114-4880

AUG 1 6 2017 DSHW-Z017-006763

Re: Interim Corrective Measures Plan (ICMP)

Hazardous Waste Management Units (HWMU) SA-3 and S-38

UTD001705029 DSHW-2017-004442

Dear Mr. Anderson:

ATK Launch Systems, Inc. (ATK) received comments from the Division following review of the ICMP for the above referenced waste management units on May 30, 2017. The ICMP was submitted on May 9, 2017, based on analytical results collected during the RCRA Facility Investigation. The RFI report showed PAH contamination exceeding the residential EPA Region 9 Regional Screening Levels (RSLs). The primary PAH analytes exceeding the RSLs were benzo(a)pyrene, dibenz(a,h)anthracene, benzo(b)fluorathene, and benz(a)anthracene.

In January 2017, the EPA released a Toxicological Review of Benzo[a]pyrene (EPA/635/R-17/003Fc). The report discusses new research that indicates benzo[a]pyrene is not as toxic as recently thought. Since receipt of the Division's comments, the published RSL values as of June 2017, have been adjusted. All four of the aforementioned analytes have seen decreases in toxicity and subsequent increases in the Residential RSLs, as shown in the table below.

A 1-4-	Residential Regional Scr	Residential Regional Screening Levels (mg/kg)							
Analyte	December 2016	June 2017							
Benzo(a)pyrene	0.016	0.11							
Dibenz(a,h)anthracene	0.016	0.11							
Benzo(b)fluorathene	0.16	1.1							
Benz(a)anthracene	0.16	1.1							



The above changes to the screening levels were discussed with Division staff members, David Larsen and Eric Baiden, on July 27, 2017. Based on the screening levels adjustments, HWMUs SA-3 and S-38 would meet the criteria to qualify for an unrestricted soil use designation. ATK therefore requests to retract the ICMP submitted on May 9, 2017. The remainder of this letter report discusses the justification for the retraction.

HWMU SA-3

The area of HWMU SA-3 comprises about 1.75 acres, and is shown in Figure 1. HWMU SA-3 was used as a storage area for drums and a lay-down yard for many other spare items. Sampling of the surface soils was conducted during the RFI using Incremental Sampling Methodology (ISM). HWMU SA-3 was evaluated as one Decision Unit (DU), but was divided into four sampling units (SU), designated as DU-1A, DU-1B, DU-2A, and DU-2B. The table below presents the ISM results for the four PAHs that were the initial reason for submitting the ICMP.

ISM Results – SA-3 Sampling Units (mg/kg)												
DU-1A DU-1B DU-2A DU-2B Mean Conc. Residential RSL												
Benzo(a)pyrene	0.05	0.049	0.420	0.030	0.137	0.110	0.580					
Dibenz(a,h)anthracene	0.010	0.011	0.056	0.056	0.033	0.110	1.92					
Benzo(b)fluorathene	0.120	0.087	0.690	0.045	0.236	1.1	6.0					
Benz(a)anthracene	0.036	0.042	0.590	0.240	0.220	1.1	0.22					

As shown in the table, benzo(a)pyrene is the only analyte of the four PAHs where the mean concentration exceeds the Residential RSL; 0.137 mg/kg verses 0.110 mg/kg. The elevated mean concentration is caused by the result from DU-2A. Sampling unit DU-2A comprises an area of about 0.34 acre, or about 20% of the total DU. The difference between the mean concentration and the RSL is within the level of error of the analytical instrumentation. The remaining three PAH analyte mean concentrations are well below their residential RSLs.

The mean concentrations were compared to a Dilution Attenuation Factor (DAF) for evaluation of groundwater protection. A default value of 20 was used. The table above indicates that all four PAH analytes had mean concentrations less than the DAF20.



The mean concentrations for the four PAH analytes were entered into the RAIS Contaminated Media (Risk) Calculator, which is maintained and updated by the Oak Ridge National Laboratory. The calculated results showed a cumulative Total Risk of 1.62×10^{-6} . Benzo(a)pyrene had an individual Total Risk of 1.02×10^{-6} . The elevated cumulative value is based on the result from DU-2A (0.420 mg/kg); 20% of the total DU area. The other PAH analytes were all less than 1.0×10^{-6} . The spreadsheet calculations are shown in Attachment A.

HWMU S-38

HWMU S-38 consists of about 0.7 acre and is shown in Figure 2. The sump received paint wastes from the southern side of the road. A northward flow from the sump is apparent on the ground surface. This flow line extended the area of evaluation north of the sump. The RFI reported that PAHs were elevated in the surface soils. A second round of samples brought the total samples analyzed to eight. The sample locations are shown on Figure 2, the table below presents the analytical results.

			Map L	.ocation	Numb	er ^{1,2,3}					
	1	5	2	3	8	4	7	6	Avg. Conc.	RSL ⁴	DAF20 ⁵
benzo(a)pyrene	0.260 ⁶	0.034	0.041	0.210	0.01	0.220	0.0097	0.034	0.102	0.11	0.580
dibenz(a,h)anthracene	0.260 ⁶	0.034	0.062	0.062	0.01	0.100	0.0068	0.034	0.071	0.11	1.92
benzo(b)fluorathene	0.260 ⁶	0.043	0.021	0.140	0.140	0.170	0.022	0.053	0.074	1.1	6.0
benzo(a)anthracene	0.260 ⁶	0.034	0.031	0.098	0.07	0.09	0.0085	0.034	0.078	1.1	0.22
Notes:		1				THE STATE OF					
(1) Locations are show	n on Figu	re 2; or	der in Ta	able is f	rom so	outh to	north				
(2) Concentrations repo	orted in r	ng/kg									
(3) Italics indicate Met	hod Dect	ion Limi	it, mg/k	g							
(4) Residential Screeni	ng Level,	mg/kg									
(5) Groundwater Protec	tion Lim	it, Diluti	on Atte	nuation	Factor	(DAF)	= 20				
(6) MDL is greater than	the RSL	concen	tration								

The table above shows that the average concentrations for all four COPCs are less than their respective RSL. Values are also less than the default groundwater protection value using a DAF20. Benzo(a)pyrene approaches the RSL; however, this is based on two elevated results from sampling points 3 and 8, as well as the elevated MDL at sampling point 1.

The mean concentrations for the four PAH analytes at HWMU S-38 were entered into the RAIS Contaminated Media (Risk) Calculator. The calculated results showed a cumulative Total Risk of 1.41×10^{-6} , very similar to the adjoining HWMU SA-3. The individual Total Risks for each PAH are less than 1.0×10^{-6} . As mentioned above, a possible reason for the



increased value could be from the high MDL concentration at sampling point 1 used in the mean concentration calculation. The spreadsheet calculations are shown in Attachment B.

Conclusions

Results from the RCRA Facility Investigation of HWMUs SA-3 and S-38 concluded that corrective action would be required to meet the residential Regional Screening Levels (RSL) for benzo(a)pyrene (BaP). BaP was reported to have exceeded the RSL in the surface soils as both units. An Interim Corrective Measures Plan was submitted and approved by the Division of Waste Management and Radiation Control. In January 2017, the EPA published a paper discussing changes in toxicity for benzo(a)pyrene. The updated RSL tables were made available in June 2017, raising the residential RSL for BaP from 0.016 mg/kg to 0.110 mg/kg.

The increases in the BaP screening level allowed for HWMU SA-3 and S-38 to be eligible for unrestricted soil use determination. The mean concentrations of the samples collected at SA-3 and S-38 are less than or within instrument error of the current residential RSL for all the PAH contaminants of potential concern. Reported values are also less than the DAF20 for groundwater protection.

Based on the information generated from the RFI and sampling events, HWMUs SA-3 and S-38 present no adverse risk to the human population or environment through ingestion, inhalation, dermal contact, or migration to groundwater. The ecological risks were addressed in the RFI report submitted in April 2016. ATK requests the Division issue a waiver of any additional ecological risk assessment activities and an unconditional soil use determination under UAC R315-101. Groundwater monitoring will not be required at these sites beyond the current Bacchus groundwater monitoring program.



Should there be any questions or comments concerning this Submittal, please contact Ron Bowlin of my staff at 801.251.4865.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

Kris H. Blauer

Manager, Environmental Services

cc: B. Maulding, DWMRC

D. Larsen, DWMRC

E. Baiden, DWMRC





Figure 1 – HWMU SA-3





Figure 2 – HWMU S-38



Attachment A

RAIS Risk Site Specific Risk HWMU SA-3

Variable	Value
LT (lifetime) years	70
ET _{nee} (exposure time) hour	15.385
ET _{me-} (child exposure time) hours/day	20
ET _{rac-3} (adult exposure time) hours/day	14
ET _{n.2} (mutagenic exposure time) hours/day	24
ET, (mutagenic exposure time) hours/day	18
ET _{6.16} (mutagenic exposure time) hours/day	14
ET, (mutagenic exposure time) hours/day	14
ED _{me} (exposure duration) years	26
ED (exposure duration - child) years	6
ED _{me.a} (exposure duration - adult) years	20
ED _{n.2} (mutagenic exposure duration) years	2
ED _{2,6} (mutagenic exposure duration) years	4
ED _{6.16} (mutagenic exposure duration) years	10
ED _{16,26} (mutagenic exposure duration) years	10
BW _{mer.} (body weight - child) kg	15
BW _{rec.a} (body weight - adult) kg	80
BW _{n.2} (mutagenic body weight) kg	15
BW _{2.6} (mutagenic body weight) kg	15
BW _{6.16} (mutagenic body weight) kg	80
BW _{16.36} (mutagenic body weight) kg	80
SA _{res-c} (skin surface area - child) cm ² /day	2373
SA _{res-a} (skin surface area - adult) cm ² /day	6032
SA ₀₋₂ (mutagenic skin surface area) cm ⁻² /day	2373
SA ₂₋₆ (mutagenic skin surface area) cm ⁻² /day	2373
SA ₆₋₁₆ (mutagenic skin surface area) cm ⁻² /day	6032
SA ₁₆₋₂₆ (mutagenic skin surface area) cm ² /day	6032
EF _{ree} (exposure frequency) days/year	300
EF _{ree} (exposure frequency - child) days/year	300
EF _{res-a} (exposure frequency - adult) days/year	300

Variable	Value
EF _{a.2} (mutagenic exposure frequency) days/year	300
EF _{3.6} (mutagenic exposure frequency) days/year	300
EF _{6.16} (mutagenic exposure frequency) days/year	300
EF ₁₆₋₂₆ (mutagenic exposure frequency) days/year	300
IFS _{res-adj} (age-adjusted soil ingestion factor) mg/kg	31500
IFSM (mutagenic age-adjusted soil ingestion factor) mg/kg	143000
IRS _{res} (soil intake rate - child) mg/day	200
IRS _{ree-a} (soil intake rate - adult) mg/day	100
IRS _{A.} , (mutagenic soil intake rate) mg/day	200
IRS _{2.6} (mutagenic soil intake rate) mg/day	200
IRS _{6.16} (mutagenic soil intake rate) mg/day	100
IRS _{16,26} (mutagenic soil intake rate) mg/day	100
AF _{res-a} (skin adherence factor - adult) mg/cm ²	0.07
AF _{res-c} (skin adherence factor - child) mg/cm ⁻²	0.2
AF ₀₋₂ (mutagenic skin adherence factor) mg/cm ⁻²	0.2
AF ₂₋₆ (mutagenic skin adherence factor) mg/cm ⁻²	0.2
AF ₆₋₁₆ (mutagenic skin adherence factor) mg/cm ⁻²	0.07
AF ₁₆₋₂₆ (mutagenic skin adherence factor) mg/cm ⁻²	0.07
DFS _{rac.adi} (age-adjusted soil dermal factor) mg/kg	88620
DFSM _{rec-adi} (mutagenic age-adjusted soil dermal factor) mg/kg	367080
City _{per} (Climate Zone) Selection	Salt Lake City, UT (4)
A _c (acres)	1.75
Q/C _{wp} (inverse of the ratio of the geometric mean air concentration to the emission flux at the center of a square source) g/m	² -s per kg/m ³ 64.76682445352344
PEF (particulate emission factor) m ³/kg	14038982582.001993
A (PEF Dispersion Constant)	13.2559
B (PEF Dispersion Constant)	19.2978
C (PEF Dispersion Constant)	221.3379
V (fraction of vegetative cover) unitless	0.75
U _m (mean annual wind speed) m/s	3.93
U _t (equivalent threshold value)	11.32

Variable		Value
F(x) (function dependant on U _/U,) unitless City _{ve} (Climate Zone) Selection A (acres)		0.0441 Salt Lake City, UT (4) 1.75
Q/C _{vol} (inverse of the ratio of the geometric mean air concentration to the emission flux at the center of a square source) g/m	² -s per kg/m ³	54.66317509374129
foc (fraction organic carbon in soil) g/g		0.010
p _b (dry soil bulk density) g/cm ³		1.5
p _s (soil particle density) g/cm ⁻³		2.65
n (total soil porosity) L/L		0.43396
θ (air-filled soil porosity) L , /L/L		0.28396
θ (water-filled soil porosity) L (water-filled soil porosity) L (water-filled soil porosity)		0.15
T (exposure interval) s		819936000
A (VF Dispersion Constant)		11.911
B (VF Dispersion Constant)		18.4385
C (VF Dispersion Constant)		209.7845
City VE mace Joading (Climate Zone) Selection		Salt Lake City, UT (4)
VF _{ml} (volitization factor - mass-limit) m ⁻³ /kg		0
Q/C _{vol} (inverse of the ratio of the geometric mean air concentration to the emission flux at the center of a square source) g/m	² -s per kg/m ³	54.66317509374129
A (acres)		1.75
T (exposure interval) yr		26
p _b (dry soil bulk density) g/cm ³		1.5
A (VF Dispersion Constant - Mass Limit)		11.911
B (VF Dispersion Constant - Mass Limit)		18.4385
C (VF Dispersion Constant - Mass Limit)		209.7845



Attachment B

RAIS Risk Site Specific Risk HWMU S-38

LT (lifetime) years	70
ET _{ree} (exposure time) hour	15.385
ET _{res} (child exposure time) hours/day	20
ET _{me} (adult exposure time) hours/day	14
ET _{0.2} (mutagenic exposure time) hours/day	20
ET _{2.6} (mutagenic exposure time) hours/day	20
ET _{6.16} (mutagenic exposure time) hours/day	14
ET _{16,26} (mutagenic exposure time) hours/day	14
	26
ED, (exposure duration - child) years	6
ED, (exposure duration - adult) years	20
ED,, (mutagenic exposure duration) years	2
	4
	10
11.71	10
Takar .	15
700.3	80
	15
	15
	80
In. In	80
SA _{res-c} (skin surface area - child) cm ² /day	2373
SA _{res-a} (skin surface area - adult) cm ² /day	6032
SA ₀₋₂ (mutagenic skin surface area) cm ⁻² /day	2373
SA ₂₋₆ (mutagenic skin surface area) cm ⁻² /day	2373
SA ₆₋₁₆ (mutagenic skin surface area) cm ⁻² /day	6032
SA ₁₆₋₂₆ (mutagenic skin surface area) cm ² /day	6032
EF _{res} (exposure frequency) days/year	300
EF (exposure frequency - child) days/year	300
EF _{res-a} (exposure frequency - adult) days/year	300

Variable Variable	Value
EF,, (mutagenic exposure frequency) days/year	300
EF _{2.6} (mutagenic exposure frequency) days/year	300
EF ₆₋₁₆ (mutagenic exposure frequency) days/year	300
EF ₁₆₋₇₆ (mutagenic exposure frequency) days/year	300
IFS _{res-adj} (age-adjusted soil ingestion factor) mg/kg	31500
IFSM _{recodi} (mutagenic age-adjusted soil ingestion factor) mg/kg	143000
IRS _{ree_r} (soil intake rate - child) mg/day	200
IRS _{rec.3} (soil intake rate - adult) mg/day	100
IRS _{n.2} (mutagenic soil intake rate) mg/day	200
IRS _{x.} (mutagenic soil intake rate) mg/day	200
IRS _{6.16} (mutagenic soil intake rate) mg/day	100
IRS _{16.76} (mutagenic soil intake rate) mg/day	100
AF _{res-a} (skin adherence factor - adult) mg/cm ⁻²	0.07
AF _{res-c} (skin adherence factor - child) mg/cm ⁻²	0.2
AF ₀₋₂ (mutagenic skin adherence factor) mg/cm ⁻²	0.2
AF ₂₋₆ (mutagenic skin adherence factor) mg/cm ⁻²	0.2
AF ₆₋₁₆ (mutagenic skin adherence factor) mg/cm ⁻²	0.07
AF ₁₆₋₂₆ (mutagenic skin adherence factor) mg/cm ⁻²	0.07
DFS _{rec-adj} (age-adjusted soil dermal factor) mg/kg	88620
DFSM _{recardi} (mutagenic age-adjusted soil dermal factor) mg/kg	367080
City Climate Zone) Selection	Salt Lake City, UT (4)
A _c (acres)	.5
Q/C _{wp} (inverse of the ratio of the geometric mean air concentration to the emission flux at the center of a square source) g/m	² -s per kg/m ³ 93.77
PEF (particulate emission factor) m ³/kg	1751187310807.8564
A (PEF Dispersion Constant)	16.2302
B (PEF Dispersion Constant)	18.7762
C (PEF Dispersion Constant)	216.108
V (fraction of vegetative cover) unitless	0.5
U_ (mean annual wind speed) m/s	2.93
U _t (equivalent threshold value)	11.32

Variable		Value
F(x) (function dependant on U/U,) unitless		0.000531111899724221
City _{ve} (Climate Zone) Selection		Salt Lake City, UT (4)
A _c (acres)		.5
Q/C _{vol} (inverse of the ratio of the geometric mean air concentration to the emission flux at the center of a square source) g/m	² -s per kg/m ³	68.18
foc (fraction organic carbon in soil) g/g		0.010
p _b (dry soil bulk density) g/cm ³		1.5
p _s (soil particle density) g/cm ⁻³		2.65
n (total soil porosity) L/L/L/L		0.43396
θ (air-filled soil porosity) L , /L coil		0.28396
θ (water-filled soil porosity) L water /L soil		0.15
T (exposure interval) s		819936000
A (VF Dispersion Constant)		11.911
B (VF Dispersion Constant)		18.4385
C (VF Dispersion Constant)		209.7845
City VE mass-Joading (Climate Zone) Selection		Salt Lake City, UT (4)
Q/C _{vol} (inverse of the ratio of the geometric mean air concentration to the emission flux at the center of a square source) g/m	² -s per kg/m ³	68.18
A _c (acres)		.5
T (exposure interval) yr		26
p _b (dry soil bulk density) g/cm ³		1.5
A (VF Dispersion Constant - Mass Limit)		11.911
B (VF Dispersion Constant - Mass Limit)		18.4385
C (VF Dispersion Constant - Mass Limit)		209.7845

Site-specific Risk Resident RISK for Soil

Chemical	Mutagen?	VOC?	Volatilization Factor (m³/kg)	da	Particulate Emission Factor (m³/kg)	Soil Saturation Concentration (mg/kg)	RBA	Concentration (mg/kg)	Child Ingestion HQ	Child Inhalation HQ	Child Dermal HQ
Benz[a]anthracene	Yes	Yes	5.69E+06	4.10E-10	1.75E+12	-	. 1	0.078			-
Benzo[a]pyrene	Yes	No	-		1.75E+12		. 1	0.102	3.73E-03	1.53E-08	1.15E-03
Benzo[b]fluoranthene	Yes	No	-	4 0 0	1.75E+12		. 1	0.074	-	-	
Dibenz[a,h]anthracene	Yes	No	6 · · · · · -		1.75E+12		. 1	0.071		-	-
*Total Risk/HI			-	-	-		-	-	3.73E-03	1.53E-08	1.15E-03

Child Total HI	Adult Ingestion HQ	Adult Inhalation HQ	Adult Dermal HQ			Adjusted Inhalation HQ				Inhalation Risk	Dermal Risk	Total Risk
								-	4.37E-08	4.45E-10	1.46E-08	5.87E-08
4.88E-03	3.49E-04	1.53E-08	1.92E-04	5.41E-04	1.13E-03	1.53E-08	4.13E-04	1.54E-03	5.71E-07	1.89E-14	1.91E-07	7.61E-07
-	-		-	-			-11	-	4.14E-08	1.37E-15	1.38E-08	5.52E-08
		100	-		No.	-	-		3.97E-07	1.32E-14	1.33E-07	5.30E-07
4.88E-03	3.49E-04	1.53E-08	1.92E-04	5.41E-04	1.13E-03	1.53E-08	4.13E-04	1.54E-03	1.05E-06	4.45E-10	3.52E-07	1.41E-06

Site-specific Risk Resident RISK for Soil

Chemical	Mutagen?	VOC?	Volatilization Factor (m³/kg)	da	Particulate Emission Factor (m³/kg)	Soil Saturation Concentration (mg/kg)	RBA	Concentration (mg/kg)	Child Ingestion HQ	Child Inhalation HQ	Child Dermal HQ
Benz[a]anthracene	Yes	Yes	4.57E+06	4.10E-10	1.40E+10		1	0.227	-		-
Benzo[a]pyrene	Yes	No	- T		1.40E+10	-	1	0.137	5.00E-03	2.57E-06	1.54E-03
Benzo[b]fluoranthene	Yes	No	-		1.40E+10	-	1	0.236	-	1 1	
Dibenz[a,h]anthracene	Yes	No			1.40E+10	-	1	0.033	-		-
*Total Risk/HI			-	-	-	-	-		5.00E-03	2.57E-06	1.54E-03

Child Total HI	Adult Ingestion HQ	Adult Inhalation HQ	Adult Dermal HQ			Adjusted Inhalation HQ				Inhalation Risk	Dermal Risk	Total Risk
-	-	-		-	-			-	1.27E-07	1.62E-09	4.24E-08	1.71E-07
6.55E-03	4.69E-04	2.57E-06	2.58E-04	7.29E-04	1.52E-03	2.57E-06	5.54E-04	2.07E-03	7.67E-07	3.17E-12	2.56E-07	1.02E-06
	-	a Tana		-					1.32E-07	5.47E-13	4.41E-08	1.76E-07
-		-	-	-	-				1.85E-07	7.64E-13	6.16E-08	2.46E-07
6.55E-03	4.69E-04	2.57E-06	2.58E-04	7.29E-04	1.52E-03	2.57E-06	5.54E-04	2.07E-03	1.21E-06	1.62E-09	4.04E-07	1.62E-06